

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Raman Patel, et al.

Examiner: Nathan M. Nutter

Serial No.: 10/754,045

Group Art Unit: 1711

Filed: 01/08/04

Date: April 10, 2006

For: **TOUGHENED POLYMER COMPOSITIONS**



Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**AFFIDAVIT OF FACT UNDER 37 CFR §1.132**

Sir:

I, Raman P. Patel, being duly sworn, hereby state:

THAT I am a co-inventor of U.S. Patent Application Serial No. 10/754,045, filed January 8, 2004, for Toughened Polymer Compositions;

THAT I have received a Bachelor of Science Degree in Chemistry from the Gujarat University in Ahmedabad, India in 1959;

THAT I have received a Masters Degree in Physical Chemistry from the Gujarat University in Ahmedabad, India in 1961;

THAT I have received a Ph.D in Polymer Science from the McGill University in Montreal, Canada in 1968;

THAT I was an employee at Monsanto Chemical Company from 1968 to 1973. I joined Monsanto at their St. Louis location as a Senior Research Chemist. In 1973 I moved to the Akron location and worked until 1996. During my tenure at Monsanto, I was promoted to Research Specialist, then to Senior Research Specialist, then to Fellow, and finally to Senior Fellow;

THAT I have been a Research Fellow from June 1997 to present at The Teknor Apex Company, Assignee of the above-identified U.S. application;

THAT I am the inventor or a co-inventor of approximately 63 U.S. Patents;

THAT I have read the Office Action for the above-identified application having a mailing date of January 9, 2006 prepared by Examiner Nutter;

THAT I have read the cited references, namely Coran et al. U.S. Patent No. 4,104,210 (the Coran '210 reference), the Coran et al. U.S. Patent No. 4,141,878 (the Coran '878 reference), and the Coran et al. U.S. Patent No. 4,130,535 (the Coran '535 reference), of which I am a co-inventor;

THAT the Coran '210 reference teaches thermoplastic elastomeric compositions which comprise about 25-45 parts by weight of polyolefin resin and about 77-55 parts by weight of vulcanized high unsaturation diene rubber as set forth in column 1, lines 40-46;

THAT the Coran '210 reference, of which I am a co-inventor, teaches and suggests that when the quantity of rubber falls below about 55 parts by weight per 100 parts by weight of thermoplastic resin and rubber combined, wherein the thermoplastic resin would necessarily include any post-vulcanization added thermoplastic resin as described in column 7, lines 8-21, that hard, rigid compositions having reduced toughness are obtained;

THAT according to the teachings of the Coran '210 reference, one of ordinary skill in the art would not be led in the direction taken by the Applicant to provide a toughened polymer composition by using relatively low amounts of rubber on the order of less than 37.5 parts of rubber based on 100 parts by weight of resin and rubber combined, as it is suggested in the '210 reference and noted by the Examiner on page 5, second and third to last line of the Office Action, that products of the instant claims according to the Coran '210 reference would thus have "reduced toughness". Instead, unexpectedly, toughened polymer compositions having improved impact resistance properties are produced, and it would not be obvious to prepare such toughened compositions based on the Coran '210 teachings;

THAT the Coran '210 reference in column 6, lines 57-63, teaches the use of extender oil in the thermoplastic elastomer composition;

THAT as known to one of ordinary skill in the art, extender oil provides greater elasticity to a thermoplastic elastomer and there is no teaching or suggestion within

the Coran '210 reference to provide a composition and methods for preparing a composition containing less than the claimed 20 parts by weight of oil per 100 parts by weight of rubber along with other claimed features which exhibit toughness as evidenced by improved impact resistance;

THAT the Coran '535 reference teaches preparing thermoplastic elastomers (vulcanizates) that can be utilized to prepare a variety of articles by extrusion, injection molding, and compression molding techniques. The Coran '535 reference further teaches that the vulcanizates are blended with thermoplastic resins wherein it is vaguely stated that the properties of the modified resin depend upon the amount of vulcanizate blended.

THAT the Coran '535 reference, of which I am a co-inventor, provides no teaching or suggestion for modifying a thermoplastic resin to produce a toughened polymer composition as claimed having the specifically claimed features and less than 20 parts by weight of extender oil per 100 parts by weight of the rubber component, and that one of ordinary skill in the art would not expect the claimed compositions to produce toughened polymer compositions, as one of ordinary skill in the art believes that adding more oil would soften the composition and thereby improve the impact resistance, whereas the contrary has been found unexpectedly to be true by the Applicants.

THAT the Coran '878 reference teaches thermoplastic elastomers of CSM rubber and polyolefin, and as stated in column 2, lines 32-38, "When the quantity of cross-linked CSM rubber, in the absence of plasticizer falls below about 50 parts by weight per 100 parts total weight of polyolefin resin and CSM rubber, or when the quantity of polyolefin resin exceeds 50 weight percent of the composition, hard, rigid compositions having reduced toughness are obtained." The teaching is relevant to whether the polyolefin resin is a matrix polymer and/or a thermoplastic polymer component.

THAT products of the instant claims according to the teachings of the Coran '878 reference, of which I am a co-inventor, would be believed to have "reduced toughness" and would not be obvious to prepare the claimed methods and

compositions, which therefore, unexpectedly, are toughened polymer compositions having improved impact resistance properties, and it would not be obvious to try to prepare such compositions based on the Coran '878 teachings;

THAT claims 11 and 13-20 teach a method for producing rotationally molded articles having toughness, including the specific limitations as set forth therein;

THAT the Coran '210 reference in column 4, lines 1-5, teaches that the thermoplastic elastomeric compositions are further processable by extrusion or injection molding and column 7, lines 11-13, further teaches making articles by compression molding techniques.

THAT the Coran '535 reference teaches making articles by extrusion, injection molding and compression molding techniques, see column 6, lines 44-46;

THAT the Coran '878 reference teaches articles may be formed from thermoplastic elastomers by extrusion, injection molding or compression molding, see column 1, lines 17-19, as well as column 6, lines 28-40;

THAT there is no teaching or suggestion within my own references, namely, the Coran '210, '535 and '878 references, of a method for producing rotational molded articles having toughness as claimed in claims 11 and 13-20.

THAT as known to one of ordinary skill in the art, rotational molding is substantially different than injection molding, compression molding and extrusion and presents different variables and challenges than extrusion, injection molding and compression molding;

THAT during rotational molding, compositions to be molded are subjected to relatively high temperatures for extended periods of time as compared to the other forms of molding, namely, extrusion, injection molding and compression molding;

THAT it is known to the art that cured and uncured rubber containing compositions are not suitable for producing rotational molded articles as the rubber is not stable during the extended period of molding time utilized in producing rotational molded articles. Further, uniform melt flow during rotational molding is a problem when utilizing rubber containing compositions;

THAT it has been unexpectedly found that the toughened polymer compositions of the present invention, including the cross-linked rubber component as claimed unexpectedly produce, according to the rotational molding method of the present invention, parts having high surface quality with excellent hardness and impact strength;

THAT according to the Coran '210, '535 and '878 references, of which I am a co-inventor, one of ordinary skill in the art would not be led in the direction taken by the Applicants in order to arrive at the claimed method for producing rotationally molded articles;

THAT in view of the above statements, Applicants' invention is readily distinguished from the Coran '210, '535 and '878 references.

Date: April 06, 2006

Raman P. Patel  
Raman P. Patel

STATE OF RHODE ISLAND           )  
  )  
COUNTY OF Providence        )

Before me, a Notary Public in and for said County and State, personally appeared Raman Patel, who acknowledged that he executed the foregoing instrument as his own free act and deed.

In witness whereof, I have hereunto set my hand and seal this 6 day of April 2006.

Linda A. McDermott  
Notary Public

SEAL

